

**Bonneville Power Administration  
Fish and Wildlife Program FY99 Proposal Form**

**Section 1. General administrative information**

**Evaluate Rainbow Trout Habitat/Passage  
Improvements of Tributaries to Lake Roosevelt**

**Bonneville project number, if an ongoing project** 9001800

**Business name of agency, institution or organization requesting funding**  
Colville Confederated Tribes

**Business acronym (if appropriate)** CCT

**Proposal contact person or principal investigator:**

Name	<u>David Alexis</u>
Mailing Address	<u>P.O. Box 150</u>
City, ST Zip	<u>Nespelem, WA. 99155</u>
Phone	<u>(509) 634-8845</u>
Fax	<u>(509) 634-8592</u>
Email address	<u>cctfish@mail.wsu.edu</u>

**Subcontractors.** List one subcontractor per row; to add more rows, press Alt-Insert from within this table

Organization	Mailing Address	City, ST Zip	Contact Name

**NPPC Program Measure Number(s) which this project addresses.**  
10.8B.10

**NMFS Biological Opinion Number(s) which this project addresses.**  
NA

**Other planning document references.**

If the project type is "Watershed" (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.

**Subbasin.**

Upper Columbia River Subbasin

**Short description.**

Increase the quality and quantity of spawning and rearing habitat and to provide passage into blocked areas in selected tributary streams to Lake Roosevelt by eliminating migration barriers, improved riparian conditions, improved instream habitat and protracted late summer flow conditions.

**Section 2. Key words**

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
	Anadromous fish		Construction	X	Watershed
X	Resident fish		O & M		Biodiversity/genetics
	Wildlife	X	Production	*	Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate	*	Monitoring/eval.		Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement	*	Wildlife habitat en-
			Acquisitions		hancement/restoration

**Other keywords.**

Resident Fish Substitution

**Section 3. Relationships to other Bonneville projects**

Project #	Project title/description	Nature of relationship

**Section 4. Objectives, tasks and schedules*****Objectives and tasks***

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determine fish population status	a	Determine the relative abundance of adult rainbow trout spawners present in five project streams.

		b	enumerate juvenile adfluvial rainbow trout outmigrants in five project streams
		c	Enumerate juvenile rainbow trout outmigrants in the SanPoil River.
2	Determine effectiveness of passage improvements.	a	Conduct spawning ground surveys above culverts on five project streams.
		b	Monitor passage locations to access the longevity of fish passage improvements.
3	Determine effectiveness of instream habitat measures on channel morphology.	a	Conduct channel morphology surveys (Horizontal control Surveys) on five study streams.
4	Determine effectiveness of riparian habitat improvements	a	Plant survivability survey
5	Comparative analysis of stream morphology, passage sites, fish habitat, and juvenile fish populations of pre and post implementation.	a	Analyze data collected in objectives 1- 4.
6	Maintenance excavation of stream channel and passage structures	a	Provide maintenance of stream channel and instream structures in instances where private property is threatened.

***Objective schedules and costs***

<b>Objective #</b>	<b>Start Date mm/yyyy</b>	<b>End Date mm/yyyy</b>	<b>Cost %</b>
1	03/1999	05/1999	27%
2			7%
3			52%
4			3%
5			8%
6			3%

**Schedule constraints.**

Completion date.  
2000

## Section 5. Budget

### *FY99 budget by line item*

Item	Note	FY99
Personnel		\$91,000
Fringe benefits		\$2,730
Supplies, materials, non-expendable property		\$3,312
Operations & maintenance		\$3,500
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	
Travel		\$24,300
Indirect costs		\$35,672
Subcontracts		\$6,183
Other		\$1,303
<b>TOTAL</b>		<b>168,000</b>

### *Outyear costs*

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	182,000	0	0	0
O&M as % of total	3%	0	0	0

## Section 6. Abstract

### ABSTRACT

The Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project is a resident fish substitution project to mitigate for anadromous fish losses above Chief Joseph and Grand Coulee Dams. The goal of the project is to increase natural production of adfluvial rainbow trout in tributaries to Lake Roosevelt through habitat and fish passage improvements in selected tributaries. Specific over-all program objectives include: Increase parr production consistent with habitat availability to help achieve a 12,000 fish harvest of adfluvial rainbow trout by the 2000; Manage adfluvial rainbow trout populations as self-sustaining populations (escapement of 6,000 adults by the year 2000); Identify future habitat/passage improvement opportunities in the "blocked areas" above chief Joseph and Grand Coulee Dams; Monitor and evaluate habitat/passage improvements. The project includes three phases: Phase I- Develop base-line information

of existing conditions and strategies/opportunities for enhancement; Phase II- Implementation of selected actions/strategies described in phase I; and Phase III- Monitor and evaluate the impacts of implementation actions. The current project scope includes phase III, which began in 1996 and will continue through 2000. Phase III will develop a comparative analysis of pre and post implementation of habitat/passage improvements by monitoring fish populations (both juvenile and adult), examining fish passage effectiveness, instream habitat effectiveness on channel morphology fish habitat and fish habitat utilization and effectiveness of riparian habitat improvement actions.

## **Section 7. Project description**

### **a. Technical and/or scientific background.**

This project is located in the Upper Columbia Sub-region above the “blocked area” created by the construction of Chief Joseph and Grand Coulee Dams. Specifically the project is located on the Colville Reservation and enhances resident fish populations as mitigation for anadromous fish losses (resident fish substitution) and is considered in-place and out-of-kind mitigation.

The construction of Chief Joseph and Grand Coulee Dams completely and irrevocably blocked anadromous fish migrations to the Upper Columbia River. Prior to hydropower development the “blocked areas” supported large diverse fish populations including eleven salmonid species (Scholz et al. 1985). The complete extirpation of anadromous fish stocks from this area reduced the native salmonid assemblage by approximately 64 percent and limited fisheries enhancement opportunities exclusively to resident fish. The adfluvial rainbow trout population in the SanPoil River has been identified as one of two potential native salmonid stocks remaining within the Colville Reservation (Jerry Marco, Fisheries Biologist, personal communication). Definitive stock origin of this rainbow trout populations is currently unknown (Leary 1997). Genetic investigations are continuing in an effort to determine stock origin. Potentially this rainbow population is closely related to indigenous summer steelhead that historically utilized the SanPoil River Basin prior to the construction of Grand Coulee Dam. Historical stocking of non-indigenous rainbow trout stocks may have influenced this population, however until the stock origin is determined this population will be managed as if it were a native stock.

Fisheries investigation (Scholz 1986) have shown that the lack of high quality spawning and rearing habitat was a limiting factor in adfluvial rainbow trout production in Lake Roosevelt and its tributaries. Limited stream surveys indicate that upstream passage barriers such as improper culvert installation and intermittent stream flows appear to limit access to available spawning habitat.

Fisheries enhancement of potential native salmonid populations where possible, while providing for the consumptive and non-consumptive utilization is consistent with the goals and objectives of the Tribe and with the State of Washington. It is also consistent with the Council’s 1994 Fish and Wildlife System Goal and the Resident Fish Goal.

Enhancing one of the few remaining potential native stocks within the reservation in locations that appears to have habitat enhancement possibilities has merit, particularly in the “blocked area” that has had extreme habitat degradation and native species extirpation. The project employs a logical path of preliminary investigation, strategic plan of action and monitoring and evaluation.

**b. Proposal objectives.**

This proposal is specifically related to the Phase III monitoring and evaluation of the Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project. The objectives will reflect only those specified in Phase III.

Phase Three objectives include: Annually determine juvenile and adult populations status of adfluvial rainbow trout in 5 study streams; Annually determine effectiveness of passage improvement measures implemented during phase II; Annually determine effectiveness of instream habitat improvement measures implemented in phase II relative to stream channel morphology and fish habitat; Annually determine effectiveness of riparian habitat improvement measures implemented in phase II; Maintenance of stream channel and passage improvement/habitat structures if private property is at risk due to implementation of actions in phase II and of provide a comparative analysis of pre and post habitat/passage improvement implementation, specifically: stream channel morphology, fish passage sites, fish habitat, habitat utilization and adult/juvenile population status.

The improvement to fluvial habitats, including passage, spawning/rearing and riparian vegetation will improve the over-all production potential for rainbow trout without utilizing artificial production as a first or primary strategy to improve stock status or increase fishery opportunity. Expected benefits include increased fishery opportunity and maintenance of genetic integrity of a potential indigenous fish population.

**c. Rationale and significance to Regional Programs.**

The project goal of enhancing/improving the natural production of adfluvial rainbow( potential native salmonid stock) trout in tributaries to Lake Roosevelt is consistent with the Council’s 1994 Fish and wildlife System Goal of “a healthy Columbia River Basin, one that supports both human settlement and the long-term sustain ability of native fish and wildlife species in native habitats where possible, while recognizing that where impacts have irrevocably changed the ecosystem, we must protect and enhance the ecosystems that remains. To implement this goal the program will deal with the Columbia River as a system; will protect mitigate and enhance fish and wildlife while assuring an adequate, efficient, economical and reliable power supply; and will be consistent with the activities of the fish agencies and tribes.” The project partially **mitigates** for anadromous fish losses in areas permanently blocked by Chief Joseph and Grand Coulee Dams by enhancing natural production through habitat improvements. This method of mitigation is consistent with the Tribes goals and objectives to maintain native species where possible while providing a subsistence and recreational fishery. The

project is also consistent with the principles, priorities and biological objectives stated in the Council's resident fish section of the 1994 Fish and Wildlife Program (Sections 10.1A, 10.1B, 10.1C and 10.8B respectively). Specifically this project concentrates its effort on a potentially native salmonid stock in the "blocked Area" above Chief Joseph and Grand Coulee Dam which is consistent with the Council's priority to native fish enhancement and substitution measures (section 10.1B), satisfies principles of substitution where in-kind mitigation is not possible, occurs in the vicinity of the salmon and steelhead losses, complements the activities of the area agencies and tribes (i.e. promotes improved fishery opportunities while utilizing the best available science), utilizes traditionally defined resident fish species (i.e., rainbow trout (section 10.1A) has accepted/approved biological objectives (section 10.1C and 10.8B). Further more the project is specifically detailed as program measure 10.8B.10.

#### **d. Project history**

This project was initiated in 1990 as partial mitigation for anadromous fish losses above Chief Joseph and Grand Coulee Dams. Total funding to date is \$1,444,911.

The long-term goal of this project is to increase both the quality and quantity of spawning and rearing habitat and to provide passage into blocked areas in selected tributaries utilized by adfluvial rainbow trout. Initial stream surveys were completed during phase I (1990-1992) that resulted in a ranked prioritization of streams that provided opportunities for adfluvial rainbow trout enhancement. Phase II implementation (1993-1995) provided development and implementation of specific actions/strategies to enhance rainbow trout production in selected streams. The current phase (phase III- monitoring and evaluation) is in the process of accessing the impacts of the habitat/passage improvement actions by monitoring stream morphology features, fish habitat, fish habitat utilization, riparian habitat conditions, status of instream structures and adfluvial population status (juvenile and adult recruitment).

Five streams were identified as priority for habitat/passage enhancement measures to increase parr production of adfluvial rainbow trout. Implementation conducted on the selected streams affected 20.9 miles of stream course and included in-stream habitat structures (log weirs, rock weirs and root- wads); stream channel reconfiguration (increased sinuosity and pool development); passage improvements (re-installation of four improperly installed culverts); riparian plant stocking (approximately 4,500) and live-stock exclosure within the riparian area (approximately 4.5 miles of fence). Spawning and rearing quantity has been increased by 11% through passage improvements alone.

Monitoring and evaluation of the five study streams began in 1996 and included annual monitoring of adult and juvenile recruitment, changes in channel morphology, status of instream structures, fish habitat, fish habitat utilization and riparian stocking success. Results for 1996 and 1997 are unavailable at this time.

e. **Methods.**

**Objective I**

**METHODOLOGY**

**Juvenile Population Estimates** will be enumerated through the five (5) year post-monitoring phase period (1997-2000) beginning September and continuing through October 31. Juvenile rainbow trout populations will be estimated in all five (5) streams by conducting electro-shocking surveys in randomly selected sections consisting of 10% of each habitat type found in a given valley segment. Populations estimates will utilize the two (2) pass methodology of Saber-LeCren (Everhart 1975). A Smith-Root model B backpack elector-fisher will be used to capture fish. A minimum of two (2) electro-fishing passes will be made for each section. Block-nets will be placed at the upstream and downstream boundaries to prevent immigration and emigration. Fish captured in the first pass will be held in buckets until after the second pass is completed, then the fish will be enumerated, measured to the nearest millimeter and weighed in grams. The fish will then be transported to the San Poil River if sub-surface flows exist in the tributaries.

**Adult Adfluvial Rainbow Trout Enumeration** will be conducted through the five (5) year post-monitoring phase period (1996-2000) beginning in mid- March and continuing through mid- May. The upstream migratory traps will be placed in the five (5) streams at preselected sites. The trap designed consists of 1- inch round aluminum tubing resembling a picket fence. The panels will be placed across the stream at an angle. The angle of the panels will lead the fish to a holding structure located in an upstream pool. Panels will be placed on the upstream end of riffle areas at a point where the stream constricts to minimize the number of panels required.

Fish captured will be anesthetized before handling to reduce stress and injury to the fish as data is collected. Methane Tricainesulfonate (MS-222) will be utilized as an anesthetic the captured fish, the amount of MS-222 to use will depend upon the water quality and the species of fish treated, levels of 100 mg/l or less have been effective (Piper 1982). Traps will be checked twice daily during the spawning periods. Once the fish have been captures, they will be placed in a plastic container containing MS-222 solution until calmed for a few moments while they are being weighed (gr), condition, sexed and lengths (mm) will be recorded and scales samples taken to assess the age and growth analysis. The fish will then be placed in another plastic container containing fresh water until the fish recover from the MS-222, then released unharmed upstream of the trap site where they can continue their migration to spawn. The trapping will continue on all project streams on a daily basis until the run ceases.



### **Juvenile Adfluvial Rainbow Trout Outmigration Enumeration**

Outmigrant traps will be constructed in January, 1996. The trap design will consist of a fyke type net that tapers to a cod end which leads to a live- box. The fyke net will be placed perpendicular to the stream. The angle of the net will lead the fish toward the cod end into the livewell. The fyke net will be placed at the lower end of a riffle next to a pool where the livewell will be anchored down with re-bar. The traps will be placed in streams at preselected sites.

Trapping juvenile rainbow trout in the five study streams will begin mid March and continue through August 31 for the monitoring period (1997-2000). The traps will be checked twice daily during the monitoring period.. Fish captured will be anesthetized with MS-222 prior to handling to minimize stress and injury to the fish as data is collected. The amount of MS-222 used is described in the Adult Adfluvial Rainbow Trout Enumeration Objective. Once fish are captured, they are placed in a plastic container containing MS-222 solution until calm for a few moments while they are being counted, measured (mm), weighed (gr), and scale samples taken. The fish will then be put into another plastic container containing fresh water until they have recovered.

Migration and enumeration of rainbow trout juveniles in the SanPoil river will be monitored using a floating screw type trap near the mouth of the San Poil River. The trap will be fished continuously, begin mid- March and continue until migration has ended. Fish trapped will be anesthetized with MS-222, measured, weighed, scale samples collected, and condition of fish recorded. The fish will be allowed to recover from the anesthesia before being released downstream of the trap.

## **Objective II**

### **Spawning Survey**

Spawning ground surveys will be conducted from Mid- March through mid- May (1997-2000) to access rainbow trout spawning activity. Project personnel will conduct foot surveys from the mouth of the streams to the upper limit of fish habitat twice a week throughout the spring spawning period (April - June). Redds will be counted, marked and precise location recorded in a field notebook. Redds will be marked with a 5/8 inch re-barr hammered into the ground on the bank nearest the redd. A description of site, date and number will be recorded on a tag which will be attached to the re-barr. Spawning ground surveys will be utilized to develop fish to redd ratios, identify spawning habitat and assess the effectiveness of passage improvements and instream habitat utilization by adult adfluvial rainbow trout.

### **Fish passage structures**

Visual observations of the condition of the various passage improvement structures will be recorded throughout the monitoring period. Project sites will be visited during periods of peak spawning migration to observe functional status, passage conditions, and the attempts of adult fish to negotiate the modified barriers. Redd counts methodology

discussed in objective I will be utilized to identify spawning activity in previously inaccessible areas. A model 2000 Flo-mate flow meter will be used to measure the velocity flow at the discharge end of the culvert to determine potential migration barriers.

### **OBJECTIVE III**

Instream structural enhancement will be monitored and evaluated throughout the five (5) year post monitoring phase for purposes of documenting functional status, maintenance, and replacement needs.

Channel Morphology Surveys (Horizontal Control Survey) will begin July 01 and end September 30, 1997-2000. Reevaluation of the 1990 Timber, Fish and Wildlife (TFW) Ambient Monitoring Procedure for all five (5) streams. Streams channel surveys will be conducted using Timber, Fish and Wildlife (TFW) Monitoring Program Methodology (Schuett-Hames et al. 1994). A field crew of two (2) or three (3) people systematically will survey the habitat of valley segments delineated in the horizontal survey. Each habitat unit will be measured for length and width. Mean depth of riffle units and a minimum and maximum depth for pool units, substrate diversity, cobble embedded and channel gradient will be measured. At every habitat unit woody debris will be counted, and categorized as logs or root wads. Diameter of woody debris will be measured, location determined and function derived. The riparian condition will be estimated by determining the canopy closure every 300 meters within the habitat units. This measurement provides an indirect measure of shading the stream receives by adjacent riparian vegetation. The vegetation along the stream bank will be categorized as follows; visual estimates of the serial or successful stage of plant communities will be made at every habitat unit. Type of dominant vegetation whether deciduous, coniferous or mixed, and land use, will be documented. Data will be recorded on standardized Timber, Fish and Wildlife (TFW) forms and entered into R-Base, a computerized data base located at the Northwest Indian Fisheries Commission in Olympia, Washington. A summary report of the data will be generated. The stream reach inventory and channel stability evaluation procedure (Pfanckuch 1975) will be used to assess stream stability conditions. The stream reach index specially targets and provides information about the capacity of streams to adjust and recover from potential changes in flow and/or increases in sediment production. The stream reach inventory and channel stability evaluation will be conducted on only those sections of streams where fishery surveys will take place. Stream reaches will be walked by two (2) or three (3) member team and standardized data forms will be completed for each stream reach. Each reach will be evaluated following the methods found in the Stream Reach Inventory and Channel Stability Evaluation Procedure (Pfanckuch 1975) and assigned a rating. This inventory in conjunction with habitat surveys will be used to assess habitat conditions and define impacts in stream reaches due to land use practices.

All stream instream structures were photographed, which showed upstream, downstream and size views before and after for record. At each site photos were taken of weirs

(rocks and logs), this will allow for future photo monitoring and comparison of photographs taken to see if the structures are working and to allow for future maintenance

Transacts will be set up at each meander site to see if they are accomplishing what they were constructed for to put sinuosity back into the stream for habitat diversity. Meanders slow the sediment and organic debris down to seal the stream bed bottom. They also increase pool ratios. The transacts will be conducted by measuring the bankfull width and depth at each meander site. The method used will come out of the Timber, Fish and Wildlife (TFW) Monitoring Procedure (Schuett-Hames et al. 1994).

Streamflow discharge and temperature will be measured monthly beginning March through November, 1997-2000. A flo-mate flow meter with a top setting wading rod will be used at each site. Stream widths will be measured and divided into at least 10 to 20 equal cells depending on the width of the stream. Velocities will then be measured at each cell at two (2) thirds of the depth, then discharge can be calculated. The methodology for taking streamflow and temperatures will be consistent with the Timber, Fish and Wildlife (TFW) Monitoring Program (Dave Schuett\_Hames et al. 1994).

#### **OBJECTIVE IV**

Annual 100% inventory of all plants within randomly selected 100 meter segments to determine survivability of species and differences between soil types. Segments will be permanently marked so that an annual inventory will allow monitoring of a percentage of total riparian habitat.

#### **OBJECTIVE V**

The comparative analysis report will be completed at the end of the monitoring period (post 2000), this will be completed for each of the five study streams. Statistical analysis of variance methodology is undetermined at this time.

#### **OBJECTIVE VI**

Due to extreme stream bedload movement gravels have accumulated in areas that may endanger road stability and private property.

Fish passage structures may be compromised due to high water flows. Re-established of these structures for fish passage is of prime concern, however vehicle passage over these structures is also a concern. Therefore, maintenance of fish passage structures and instream habitat structures will be considered if the risk to roads and private property is eminent

#### **f. Facilities and equipment.**

All field equipment to conduct the horizontal control surveys, fish habitat surveys are adequate to complete the tasks identified. The juvenile population surveys will be

conducted using a Smith - Root Model 12B electro-shocker. The adult and juvenile out-migrant monitoring will use picket weirs and fyke-net- live- box trapping equipment respectively. These two trapping methods are adequate in moderate flow conditions, however trapping is compromised during high water and bed-load movement. Alternative trap designs for high flow conditions are being investigated at this time.

**g. References.**

Everhart, H.W. and W.D. Young. 1975. Principles of fishery science. Cornell University Press, Ithaca and London.

Leary, R.F. 1997. Hybridization between introduced and native trout in waters of the Colville National Forest. Report No. 97/3. Division of Biological Sciences, University of Montana, Missoula, Montana.

Piper R. G., I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler and J.R. Leonard. 1992. Fish hatchery management. United states Depart. Interior, fish and Wildlife Service, Washington, D.C.

Scholz, A.T., K. O’Laughlin, D. Geist, D. Peone, J. Uehara, L. Fields, T. Kleist, I. Zosaya, T. Peone and K. Teesatuskie. 1985. Compilation of information on salmon and steelhead total run size, catch and hydropower related losses in the Upper Columbia River Basin, above grand Coulee Dam. Fisheries Technical Report No. 2. Upper Columbia United Tribes Fisheries Center, Eastern Washington University, Department of Biology, Cheney, Washington.

Scholz, A.T., J.K. Uehara, J. Histata, and J. Marco. 1986. Feasibility report on restoration and enhancement of Lake Roosevelt Fisheries. Upper Columbia United Tribes Fisheries Center, Eastern Washington University, Cheney, Washington.

Schuett-Hames, D., A. Pleus, L. Bullchild and S. Hall. 1994. Timber fish and wildlife ambient monitoring program manual. Northwest Indian fisheries Commission.

## **Section 8. Relationships to other projects**

This project works cooperatively with the Coville Tribal Fish Hatchery program and Chief Joseph Kokanee Enhancement Project to accomplish the fish trapping tasks of this project

## **Section 9. Key personnel**

David Alexis, Project biologist

Jeff Palmer, Fisheries Technician

The persons involved with this project meet the educational and experience requirements of the Colville Confederated Tribes of the Colville Reservation for these types of positions. The Tribes are the entity charged by law with the responsibility for carrying out these types of activities.

## **Section 10. Information/technology transfer**

Dispersal of information regarding this project will be primarily through annual reports submitted to BPA. Additional information may be released during meetings between co-managers in the subbasin and in public meetings when requested.